Ceramic Chemistry

Manufacturing Technologies

The Manufacturing Science and Technology Center develops both aqueous and non-aqueous chemical synthesis routes to generate highly controlled ceramic powders for fabrication of electronic components. Chemical synthesis methods offer advantages over conventional ceramic processing including superior chemical homogeneity, precise control of additives and minimization of contaminants. The lab staff scales synthesis routes from bench-scale through pilot production quantities (up to 10 kg batch size). Other areas of expertise include developing coatings for catalyst supports, process characterization and optimization through Design of Experiments, and integration of powder synthesis processes with subsequent billet and component fabrication processes.

Capabilities

- Develop new chemical preparation processes for producing ceramic powders for electrical and other applications
- Perform process development needed to scale-up laboratory research processes to small lot production
- Develop ceramic coating processes for the application of ceramic slurries

Aqueous Power Processing

Resources

- Four laboratories supplied with HEPA-filtered air containing class 100 down-flow hoods
- Laboratory equipment for the synthesis of organic and inorganic ceramic precursors
- Powder consolidation equipment for billet fabrication
- Prototype ceramic machining

Accomplishments

- Established small lot production capability for high field varistors
- Scaled laboratory process for synthesis of PZT powders to small lot production level

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